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ABSTRACT

This report presents ideas on the campus to workplace transition gathered from five regional workshops conducted in 1998-99. It notes that although business and higher education agree on the importance of changes in this transition, major differences exist between how these two sectors propose to accomplish such improvements. The workshops suggest that while the latter differences can be spanned, a greater chasm exists between the challenges of a changing global environment and the strategies necessary to arm graduates with needed skills in today's ambiguous work world. Recommendations focus on translating principles into local action and address: (1) the need for students to develop flexible and cross-functional skill sets, such as leadership, teamwork, problem solving, time management, communication and analytical thinking; (2) the need for students to develop such personal traits as ethics, adaptability, self-management, and global consciousness; (3) the need for a business-higher education collaborative process for restructuring curricula and teaching methods; (4) the need to provide more opportunities for college students to apply theoretical concepts; (5) the need for university career service advisors to build linkages to corporate recruiters; and (6) the need to include faculty in the academic-corporate dialogue and to focus on practical action-oriented items. Nine case studies illustrate effective business-school collaborations. (DB)

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SPANNING THE CHASM:
A Blueprint For Action

Academic & Corporate Collaboration:

Key to Preparing Tomorrow's

High-Performance Workforce

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The Business-Higher Education Forum thanks the following individuals, universities, institutions and corporations for contributing to the development and success of the regional workshops and for having the vision to recognize the importance of producing this report: *Spanning the Chasm: A Blueprint for Action*.

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Dearborn, MI — June 1998
James C. Renick, Chancellor, University of Michigan-Dearborn
Charles M. Chambers, President, Lawrence Technological University

Los Angeles, CA — October 1998
Charles B. Reed, Chancellor, The California State University
Barry Munitz, President and CEO, The J. Paul Getty Trust

Phoenix, AZ — October 1998
Paul A. Elsner, Chancellor, Maricopa County Community College District

Boston, MA — November 1998
Sherry H. Penney, Chancellor, The University of Massachusetts Boston

Atlanta, GA — January 1999
Betty L. Siegel, President, Kennesaw State University
Ray Robinson, President-Southern Region, AT&T

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Colleen Grotsky, Executive Assistant to the Chancellor, University of Michigan-Dearborn

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Judith T. Irwin, Acting Director, Business-Higher Education Forum, coordinated the Forum's efforts in developing and conducting the workshop series and served as the General Editor for this report.

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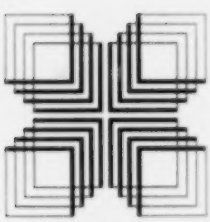
SPANNING THE CHASM: A Blueprint For Action

Academic & Corporate Collaboration: Key to Preparing Tomorrow's High-Performance Workforce



Business-Higher Education Forum
a partnership of the
American Council on Education
and the National Alliance of Business

September 1999

The **Business-Higher Education Forum**, a partnership of the American Council on Education and the National Alliance of Business, is a membership organization comprised of selected chief executives from major American corporations, colleges, universities and museums. The purposes of the Forum are to identify, review and act on selected issues of mutual concern; to enhance public awareness of these concerns; and to help guide the evolution of cooperation between corporations and institutions of higher education, while preserving their separate functions. Over the years, the Forum has addressed such critical issues as international economic competitiveness, education and training, R&D partnerships, science and technology and global interdependence. FORUM CHAIR: Henry A. McKinnell, President and Chief Operating Officer, Pfizer Inc.; FORUM VICE CHAIR: L. Dennis Smith, President, University of Nebraska; ACTING DIRECTOR: Judith T. Irwin. For more information, contact B-HEF, One Dupont Circle, Washington, DC 20036 tel: 202-939-9345; fax: 202-833-4723; internet: www.bhef.org

The **American Council on Education (ACE)** is the nation's coordinating association of higher education associations. ACE is dedicated to the belief that equal educational opportunity and a strong higher education system are essential cornerstones of a democratic society. ACE maintains both a domestic and an international agenda. Seeking to advance the interests and goals of higher and adult education in a changing environment, ACE provides leadership and advocacy on important issues, represents the views of the higher and adult education community to policy makers and offers services to its members. ACE PRESIDENT: Stanley O. Ikenberry; ACE CHAIR: John DiBiaggio, President, Tufts University. For more information, contact ACE, One Dupont Circle, N.W., Suite 800, Washington, DC 20036 tel: 202-939-9300; fax: 202-833-4766; internet: www.acenet.edu

The **National Alliance of Business (NAB)** is the only national, nonprofit, business-led organization focused solely on human resource issues. The Alliance and its member companies are leading efforts to improve American education, build bridges from school to work, expand life-long learning opportunities for all workers, as well as implement workforce development and job-placement systems that meet the needs of employers and job seekers. NAB PRESIDENT AND CEO: Roberts T. Jones; CHAIRMAN: Edward B. Rust Jr., Chairman and CEO, State Farm Insurance Companies. For more information, contact NAB, 1201 New York Avenue, N.W., Suite 700, Washington, DC 20005 tel: 202-289-2888; fax: 202-289-1303; internet: www.nab.com

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Judith T. Irwin . . . . . General Editor

FOREWORD

The Chasm Can Be Spanned . . .Together

The Business-Higher Education Forum's 1997 report, *Spanning the Chasm: Corporate and Academic Cooperation to Improve Workforce Preparation*, noted that changes were needed in the campus-to-workplace transition. It also noted that when it came to agreeing *how* to accomplish those improvements, a chasm appeared to separate the academic from the corporate sector.

This new report presents ideas gathered from five regional workshops conducted by the Forum around the country as an implementation step to spanning that chasm. It focuses on suggestions drawn from the workshops for collaboration and cooperation between businesses and higher education. The goal is to help ensure that new employees entering the workforce are prepared to meet the challenges of the modern workplace and a global society.

The Forum began working toward this goal five years ago when, under the leadership of its then Chairman, Harold A. "Red" Poling, Retired CEO and Chairman of Ford Motor Co., a detailed study was conducted to determine the skill competencies required of college undergraduates—as perceived by academic and corporate leaders, as well as by recently hired graduates.

The study revealed that to succeed in an environment of continual change, students must now graduate with highly developed cross-functional, flexible skills in leadership, teamwork, problem solving, time management, self-management, adaptability, analytical thinking, global consciousness and communications. In addition, it noted that students must receive more guidance and preparation from *both* business *and* educators.

Spanning the Chasm: A Blueprint for Action builds on this study by offering ideas and approaches that corporations and higher education can employ to develop better lines of communication. And through these lines, to discover collaborations that will help students achieve the necessary skills to improve the campus-to-workplace transition.

> This report is designed to be used as a blueprint for building ideas into goal-oriented *local* actions to help prepare college graduates for tomorrow's high-performance workforce.

To ensure the best possible ideas, the workshops brought together representatives from the corporate and academic sectors, along with current students and graduates in their first jobs.

Attendees included industry chief executives and managers, college and university presidents and provosts, corporate recruiters, human resource directors, teaching faculty from liberal arts, engineering and business, career service advisors, students and newly hired college graduates. Participants were asked to develop ideas on how to better prepare college students for the workforce.

The outcome of the workshop dialogues indicated that the chasm *can* be spanned: by *talking* together, ways of *working* together to achieve common goals come to light and new ideas for action are generated. The workshops also showed that the real chasm is not between the corporate and academic sectors,

but rather between the challenges presented by an ever-changing global environment and the strategies now necessary to arm graduates with the skills they need to make a successful transition from the campus to today's ambiguous work world.

For easier reference, the workshop material presented in this report is divided into six core recommendations (see pages 7-9) that revolve around addressing the questions:

1. *What can be done to ensure students acquire the skills and attributes necessary to succeed in today's high-performance workplace?*

2. *What can higher education and/or industry do to help students develop these skills?*

In addition to presenting these recommendations, the report includes a variety of case studies that highlight examples of successful academic-corporate collaborations and partnerships from around the country. A special "Call-to-Action" section reiterates the steps that can be taken *now* by business and higher education to start establishing the links necessary to help ensure that America's graduates are ready to contribute in a global society.

As its name implies, this report was designed to be used as a blueprint for building ideas into *local* goal-oriented actions.

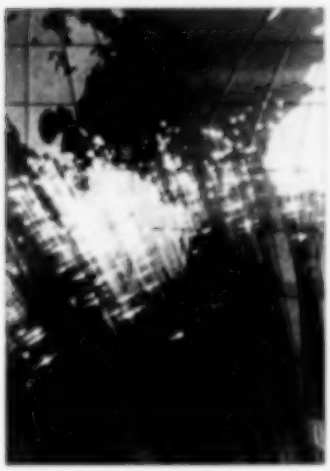
The work done by the Forum has made a significant start in helping further the academic and corporate collaboration needed to prepare tomorrow's high-performance workforce. But this improved workforce can become a reality only if colleges, universities and businesses *continue* to work with one another on a local level to generate ideas and solutions that lead to actions.

Together, we *can* span the chasm!

The Forum is a partnership of the American Council on Education (ACE) and National Alliance of Business (NAB) and is comprised of chief executive officers from the corporate, academic and museum communities.

The five "Spanning the Chasm" workshops were conducted by the Forum throughout 1998 and January of 1999 in Arizona, California, Georgia, Massachusetts and Michigan and were funded by NAB, the Mott Foundation and the host institutions.

SPANNING THE CHASM:
A Blueprint for Action



Over the last two decades, technology has exploded and along with it the base of knowledge itself. Today, it is estimated that the whole of human knowledge doubles every five years. Such an accelerating rate of change in the world impacts every aspect of daily life, both at home and work. It also impacts the very nature of education.

Increasing global pressures further impact the traditional worlds of work and education. Today, Americans must compete against a world-wide labor force that is rapidly increasing in size, education and urbanization. If Americans are to remain competitive in this expanding marketplace, U.S. businesses and organizations must find ways of doing things better, more cost-efficiently and faster—all of which affects work methods while demanding increased, broader skills from workers.

As a result, academia—especially higher education—can no longer focus primarily on the acquisition of information. If it did, new material or courses would need to be added to the curriculum continually, making it a challenge for students to ever complete their degrees.

And yet, somehow, the expanding sphere of knowledge, as well as the rapid and continual world changes, *must* be addressed if this country's college graduates are to be prepared to meet the demands of the future.

At present, it appears they may not be. According to a number of studies, including the original *Spanning the Chasm* conducted by the Business-Higher Education Forum, American college graduates are entering the workplace ill-equipped to effectively contribute in a fast-paced world economy. In fact, serious gaps now exist between the skills possessed by graduates and those required by today's high performance jobs. The majority of students are severely lacking in flexible skills and attributes, such as:

- leadership
- teamwork
- problem solving
- time management
- self-management
- adaptability
- analytical thinking
- global consciousness
- basic communications, including listening, speaking, reading and writing

This revelation is forcing both businesses and educators to re-examine traditional methods of learning while seeking new methods of linking the dynamics of external growth and change to the established structures of higher education.

Workshops Developed to Seek Solutions

In seeking solutions, Forum members recognized that no amount of rhetoric on the part of *any* group would bring about the changes needed to ensure that America's college graduates are prepared for their future roles in a high-performance, global workplace. Only active, cooperative efforts can accomplish this task.

The Forum, in cooperation with the National Alliance of Business (NAB), took the first step toward the goal of helping ease the transition from the campus to the workplace by conducting a series of regional, round-table workshops held around the country throughout 1998 and January 1999. These workshops brought together business and academic leaders, along with students and newly employed graduates, to discuss ways of integrating appropriate change into higher education.

It is important to remember that the workshops—*and this report*—were not developed to uncover faults or point fingers. Instead they were designed to promote increased, in-depth dialogue between the sectors and to help them discover new ways of working together.

Workshop participants agreed from the beginning that, essentially, universities are not failing to do their jobs and employers do not expect colleges to become training grounds for their workers. The role of the university always has been and will continue to be to help develop the whole person; to broaden the student's base of knowledge and world understanding. As such, liberal arts will always be valued. However, the participants also felt that as a society, Americans do expect higher education to reflect the world in which people work and live. In addition, college students expect the degrees they have worked hard to earn to have relevance in a workplace they must enter upon graduation.

Today, both the world and workplace are changing at a rapid rate. Universities and colleges now must re-examine what their curricula offer and how accurately these programs of study reflect the external world while meeting student and employer needs. Dialogue between the corporate and academic sectors is a first step in such an examination. This was the main goal of the Forum workshops.

This report—based on workshop discussions—presents a number of ideas to help graduates make a smoother transition from the campus into an ambiguous workplace that is continually reacting to escalating world changes. No single idea represents the complete answer to the dilemma facing higher education. Each represents simply a *step* toward an ever-changing end goal. The search for answers is an on-going process that will continue to challenge both businesses and educators. But it is a search that must be made. Ignoring the problem will not make it go away.

Chasm Is Really Between Challenge and Solution

Much was said about the chasm that appears to divide the corporate and academic worlds in the Forum's earlier report: *Spanning the Chasm: Corporate and Academic Cooperation to Improve Workforce Preparation*. But what the follow-up workshops revealed is that the widest chasm does not lie between the two sectors. That chasm can be spanned by building closer relationships to increase dialogue and effect change. Rather, the most difficult gulf to bridge is the one that separates the challenges presented by a world in flux from the strategies now needed to ensure that this country's graduates can succeed in today's environment of change.

These challenges are especially difficult for institutions of higher education which traditionally were designed to be stabilizing influences on society. Today, colleges and universities must juggle their many traditional academic functions with demands associated with responding to the very real changes of the external world.

What is most needed NOW is a blueprint for action. . . a plan for building bridges that will span the chasm between the challenge and solution. . . action that will address the changes that are posing serious problems for higher education.

These problems exist because the ways in which people work are rapidly changing. For example, the past job requirements of an accountant were fairly straightforward—thorough knowledge of accounting theory and an attention to detail. That no longer is enough. To succeed today, accountants also must be computer savvy, be conscious of world issues and bring to the job a variety of seemingly unrelated skills, such as the ability to work well as part of a team and to communicate ideas clearly both verbally and in writing. In fact, standard expectations for *every* job continue to rise around the world. Compounding this problem is the reality that standards are not only constantly rising, but also are continually changing.

With continuous and rapid changes, *nothing* remains static, including any "fixes" initiated to deal with change. To effectively embrace this continual ambiguity, businesses and educators must find

ways to integrate the "ability to change quickly" into learning and work habits. A completely different culture of education based on new relationships between schools and businesses lies ahead with new learning modalities, including times, places and ways of learning and new expanded roles for both professors and business professionals.

Report Focuses on Core Recommendations

These challenges were addressed during the Forum workshops. Six core recommendations surfaced consistently throughout the discussions. Each of these recommendations addresses points of concern that are of long-term importance to both industry and education and provides a number of ideas and action suggestions to help meet the challenges.

To maintain a focus on the students, this report organizes the six core recommendations by addressing two main questions. The first asks: **What can be done to ensure students acquire the skills and attributes necessary to succeed in today's high-performance workplace?** Methods of obtaining the basic skills and attributes required, regardless of the career path chosen, are discussed.

The second set of recommendations revolves around the question: **What can higher education and/or industry do to help students develop these skills and attributes?** Inherent in these suggestions is the basic premise that students currently are not acquiring the skills and competencies they need for the workplace. If they were, there would be far fewer concerns raised by both the graduates and the companies who hire them.

The two questions and six core recommendations are all inter-related. As such, many of the suggestions overlap. Key points, therefore, appear under more than one core topic.

Each of these recommendations (pages 7-9) must be considered from a local perspective. What can be done at the grassroots level to help build better lines of communication between education and industry? Which ideas ultimately will result in local action-oriented collaborations? Which actions can be taken now?

It is only by putting recommendations like these into play that change will occur, and in the process the chasm between challenges and solutions will begin to close.

What Can Be Done to Ensure Students Acquire the Skills and Attributes Necessary to Succeed in Today's High-Performance Workplace?

#1

In addition to providing pertinent data, the core curriculum needs to help students develop flexible and cross-functional skill sets, including leadership, teamwork, problem solving, time management, communication and analytical thinking.

- Students must learn that as employees they will be expected to contribute to corporate success and that success is "customer-driven."
- Student portfolios of projects and class work that provide connections to adult roles are an effective means for communicating accomplishments and capabilities to prospective employers. Used in conjunction with coaching from faculty and business mentors, portfolios can help students become more capable of conducting self-assessments of their work.
- Extracurricular activities and college projects that require teamwork can help students learn to value diversity and deal with ambiguity.
- Faculty should strive to make all student learning relevant to "real world" situations (i.e., drawing from current events and daily life outside the classroom).
- Essays and open-ended questions tests that require students to demonstrate practical applications of theories should be the norm, rather than memorization exams.
- Because most students learn best when new material is presented in context, rather than in abstract terms, faculty should utilize problem-solving teaching opportunities in addition to theoretical discussions.
- New teaching methods, such as team-teaching with faculty from various departments on campus, and materials such as the latest software, are needed for students to develop the desired workplace skill sets. This will require release time and professional development opportunities for faculty.
- New assessment methods must be developed to test student competencies.

#2

Methods of helping students acquire or reinforce required personal traits, including ethics, adaptability, self-management, global consciousness and a passion for life-long learning must be integrated into the core curriculum.

- Foreign language courses help students understand world cultures and develop a global consciousness and should be required.
- It is essential that the concept of helping students achieve these required personal traits through their studies be coordinated between K–12 and colleges and universities. This will help ensure that the development of these traits begins at an early age.
- Traditional jobs are changing. New jobs require employees who can think for themselves, make on-the-spot decisions and think on an international scale. The "mass production" methods of educating must be revised to address these workplace changes.
- Teachers—from K–16—need to help parents understand the importance of encouraging their children to get involved in school and community service activities.
- Faculty should emphasize to students the importance of taking personal responsibility and being adaptable.
- Volunteer work and involvement in community projects provide students with opportunities to acquire essential life skills while instilling a sense of civic responsibility.

What Can Higher Education and/or Industry Do to Help Students Develop These Skills and Attributes?

#3

Developing a collaborative process for restructuring curricula and teaching methods to keep pace with the constantly changing needs of today's global economy must become a critical priority for business and higher education.

- Faculty "recognition" of the need for updating the curricula to keep pace with the accelerating rate of change in today's business world is a vital step in initiating required innovations.
- Distance learning technologies offer the promise of enhancing the capabilities of traditional universities to reach older, working students.
- More flexible, year-around class schedules, including evenings and weekends, are needed to accommodate working students.
- Cooperative education courses (co-ops), internships and other practicums facilitate the school-to-work transition.
- Awarding academic credit to students who demonstrate knowledge, skills and competencies based on experience, in addition to classroom learning, is a trend that is gaining momentum. Appropriate reviews and means of assessment are needed to ensure wider acceptance of this trend.
- Corporate participation and involvement on university advisory boards are tangible "first steps" in the on-going communication process that is needed to keep curricula current.
- Guest lectures and corporate speaker series provide unique insights to help students better understand how business actually functions.
- Requiring interdisciplinary courses and projects will benefit students by helping them integrate skills and by presenting them with a broader range of perspectives.

#4

Both the corporate and academic sectors must provide more opportunities for college students to take theoretical concepts and apply them to "real" learning experiences.

- Corporate investment in meaningful co-op courses, internships and other hands-on work opportunities can provide students with optimal applied learning experiences.
- Corporate mentoring and executive role modeling via video broadcasts and satellite transmissions can help reach a greater number of students.
- More consistent use of case studies and examples by faculty will help students understand the practical applications of abstract concepts.
- Students need access to current computing technology if corporate expectations about student computer literacy are to be met.
- Alumni can serve as valuable "on-call" advisors when students need assistance with school or career issues.

#5

University career service advisors need to become more visible on campus and to build linkages to corporate recruiters who can help keep them current with the continually changing workplace.

- Career service offices need to be highly visible and easily accessible.
- Faculty should encourage students to work with career service advisors.
- Close working relationships between corporate recruiters and college advisors will benefit students throughout their academic and working careers.
- Transition from campus to employment begins on day one of the college experience. Freshmen, sophomores and juniors—not just seniors—need to be invited to job fairs, workshops and career planning sessions.
- Viewed in business terms, students and corporations are the "customers" of colleges and universities. "Customer surveys" of alumni, current students and corporate leaders are one way to discover "what works and what doesn't."
- Corporate recruiters can play a valuable role by assisting career service advisors in conducting student workshops on "job-search skills" and "which employment skills are in demand."
- Student organizations would benefit from active participation of business executives and professionals who are willing to serve as external advisors.

#6

The academic-corporate dialogue should include faculty and focus on practical, action-oriented items to ensure that college graduates are prepared for today's high-performance workplace.

- Inviting faculty to corporate programs that showcase the latest industry developments is an excellent mechanism for generating awareness of emerging skill requirements.
- Clear articulation of skill requirements by employers will greatly enhance the ability of faculty to develop appropriate curricula and teaching methods.
- Rewards and incentives—especially for faculty—need to be devised to encourage more corporate-academic interactions via partnerships and co-investments.
- The criteria for faculty hiring and evaluations must be adjusted to allow consideration of time spent on externships and other work-based development activities.
- A greater corporate presence on campus is necessary to help both students and faculty keep current with workplace issues and priorities.
- Many students learn best by doing, and so do faculty members. The best educators are also often practitioners. Fellowships, release time for consulting and periodic sabbaticals all offer faculty opportunities for keeping current with corporate expectations for employees.
- Corporate training programs are an excellent way to train employees for unique and industry-specific skills. Including faculty from local colleges and universities in these training programs will broaden understanding and opportunities for mutually beneficial partnerships.

WORKSHOP OUTCOMES

In following up with the hosts of the five regional Forum workshops, it became clear that setting up academic-corporate dialogues does produce action-oriented results. Below are but a few of the activities that were direct outcomes of the Forum workshop discussions.

- ***Multi-Level Discussions Established***

  An institution-wide series of development workshops is being planned at **Kennesaw State University**, Atlanta. These workshops will include participation of leaders from the greater business community of that area. Similar, more targeted sessions also will be held by each academic unit, as well as by the various departments within those units. The goal of these multi-level discussion groups is to help the institution develop strategies that can be adopted at the instructional level to ensure that students are being properly prepared for the future.

- ***Course Now Requires Career Planning***

  A recurring message at the Dearborn Workshop was that one reason students are ill-prepared to enter the workforce is they do not use campus resources to assist them in thinking about and planning for their careers. To heighten interaction with **University of Michigan-Dearborn** career service resources, one professor revised the syllabus for his organizational behavior course.

  In addition to other course assignments, students now must also complete two writing projects. In the first paper, students create and document their own personal career development strategies. For the second paper, they write about their experiences using two UM-Dearborn resources (i.e., a resource developed by the professor for his students and the Career Services Office). Students are particularly guided to FOCUS II, a computerized career planning system for self-assessment and career exploration located in the Career Services Office.

- ***Students Meet the Leaders***

  The Senior Executive Leadership Forum at the **College of Management, University of Massachusetts Boston**, provides an opportunity for students to meet "distinguished executives" from business, industry and government. The forum also allows students to learn first hand about the issues and trends facing businesses today.

- ***Shadowing Proves Mutually Beneficial***

  The Fidelity Shadowing Program was set up as a joint effort between **Fidelity Investments** and the schools of business (Boston, Dartmouth, Amherst and Lowell) in the **University of Massachusetts System**, to offer students an opportunity to learn about information technology careers in Fidelity. Many of the students who participated in the first week-long program held in January 1999 applied for co-op positions with Fidelity.

- ***Partnership Supports Student Workshops***

  Associated Industries of Massachusetts (AIM) formed a partnership with the **College of Management at the University of Massachusetts Boston** to provide support for the school's eight-week Job Strategies Workshop series. These workshops focus on resume writing, interviewing skills, career development and job success.

- ***Many Avenues Being Explored***

  Several ideas discussed at **The California State University (CSU)** workshop now have become a priority for many single universities within the CSU system. Among initiatives being encouraged are: including members of the college's advisory boards in the formal development of their strategic plans; working toward a goal of 30-40% of graduates having internship or service-learning experiences; providing summer stipends for faculty to develop service-learning courses; developing assessment instruments and follow-up satisfaction studies for both alumni and employers; increasing industry-related events on campus; and establishing formal faculty-student mentoring programs.

- ***Technology Studies Get Boost***

  Maricopa Community Colleges (MCC) introduced a number of initiatives as a result of the partnership possibilities discussed during the workshops. They include:

  - Working with the information technology software industry to develop an upscale curriculum to better prepare students to become programmer analysts and to establish faculty and student internships within the industry
  - Developing programs in Cisco Networking Technology and a full spectrum of Microsoft certification programs
  - Offering a faculty development program with a focus on courses to upgrade skills in information technology
  - Co-sponsoring an information technology workforce development forum with the Arizona Software Association

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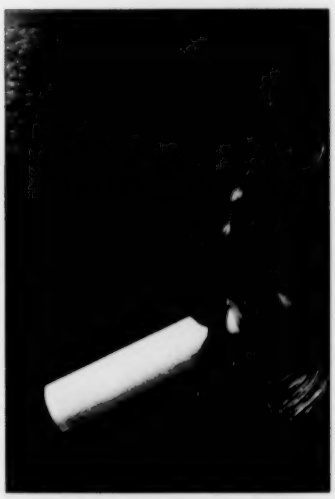
STEPS THAT CAN BE TAKEN NOW—*BY EITHER UNIVERSITIES OR BUSINESSES OR BOTH*—TO HELP SPAN THE CHASM ON A LOCAL LEVEL.

- Set up national, state and local advisory boards of employers and educators who meet regularly to discuss issues of concern to both sectors, including appropriate course work to be included in the curriculum.
- Develop structured exchange programs that place professors in the workplace and business personnel in universities.
- Initiate structured exchange programs between academic career counselors and corporate recruiters.
- Arrange for alumni, recently graduated students and corporate leaders to speak on campus about the workplace.
- Establish capstone projects that require seniors to complete internships and/or split their final year between work and academics.
- Plan regularly scheduled seminars on changes in the environment, expectations, work processes and career opportunities. Involve both industry and academia in the seminar presentations.
- Encourage national organizations representing both business and higher education to address campus-to-workplace issues and to conduct studies of importance that will help universities and colleges find the tools to close the chasm.
- Set up joint communications between universities and employers about the impact of technology on learning and work. New teaching tools change the ways people learn and how professors teach. The technology of learning, therefore, is a topic that needs to be discussed on a *regular* basis.
- Consider including competency certificates within degrees. For example, students may still earn a Bachelor of Arts degree in English but also could hold competency certificates in technology and accounting as a way of communicating to employers the skills they possess. These skills may be acquired in a corporate setting with recognition granted through the university.
- Urge business persons and practitioners to serve as external advisors to student organizations.
- Ask corporate human resource personnel to conduct campus workshops on job-search skills.
- Sponsor career development activities on campus for both students who are about to enter the workforce and those who are just beginning their college studies.
- Develop and sustain substantial cooperative education and work experiences for college students.
- Ask alumni to be short-term tutors and/or mentors for individual students.
- Identify the items needed by the university that businesses would find useful to support.
- Train faculty in the latest technologies so they, in turn, can teach the students.
- Create "virtual reality" labs to help simulate the work environment students will be entering upon graduation.
- Establish and promote foreign exchange programs for all areas of study to help students become more culturally diverse.

As discussions in the Forum workshops revealed, everyone learns best when examples are provided to illustrate new ideas. Following are a variety of case studies that highlight successful collaborations and partnerships between business and higher education. Reading about what others have done may inspire ideas for local projects to help academic and corporate leaders prepare tomorrow's high-performance workforce.

Book and Course Designed to Enrich Senior Year

■ ***University of South Carolina • Columbia, South Carolina*** ■



To help graduates get the most from their final year on campus, University of South Carolina Professor John Gardner (in collaboration with Gretchen Van der Veer) edited the book ***The Senior Year Experience.*** This book, published in 1997 by Jossey Bass, is only part of Gardner's ongoing efforts as Executive Director of the National Resource Center for The First Year Experience and Students in Transition.

Since 1990, the center has hosted a series of national conferences that bring together teaching faculty, academic administrators, student affairs administrators and corporate employers to address the challenge of making college seniors more successful in their transition out of college.

An outgrowth of these conferences, Gardner's *The Senior Year Experience* is a sequel to his 1989 classic, *The Freshman Year Experience.* Featuring original contributions from expert scholars and practitioners in the field, the book is filled with ideas and strategies for improving the passage from the senior year into the workforce. Suggestions are given on how to integrate service learning into the general education program, establish community centers, implement leadership programs and embrace diversity and multiculturalism on campus. The issue of being able to create new programs in times of scarce resources also is covered.

In addition, *The Senior Year Experience* maps out the criteria for creating special courses such as the new **University 401 - Senior Capstone Experience** Gardner developed for the University of South Carolina. These special topic courses help seniors learn to integrate their major programs of study and general education into issues of transition to either employment or graduate school. Course requirements include such activities as working together on a class team project; assembling a portfolio of undergraduate accomplishments and engaging in a variety of self-assessment career planning processes.

Educators and business leaders interested in further dialogue about capstone courses or other topics concerning the successful transition of seniors to the workforce can converse electronically through the National Resource Center's listserv e-mail address on the Internet. (listserv@vm.sc.edu)

Businesses Team Up; Take Charge of Labor Market

■ ***Intel Corporation • Santa Clara, California*** ■

Founded in 1968, Intel is the largest computer chip manufacturer in the world. The company's introduction of the first microprocessor more than 25 years ago supplied the computer and Internet technology that continues to change the world.

The shortage of skilled workers to fill high-tech and other jobs around the country has driven businesses to use unprecedented strategies to take control of their own labor markets.

When Intel Corp. decided to open a manufacturing operation in Fort Worth, Texas, the company's workforce development manager, Pat Foy, decided to **collaborate with competitors** in order to prepare the necessary future pool of job-ready applicants.

Foy convinced a group of competing high-tech companies, including Texas Instruments, Motorola, National Semi-Conductor and Hitachi, to form a partnership to help workers develop the skills they needed to thrive in the Dallas-Fort Worth labor markets.

Industry projections for the region estimate that more than 10,000 additional high-tech jobs will need to be filled in the next five years. To prepare workers for these positions, Foy and his colleagues presented an offer to 15 technical and community colleges in the region to support a customized technical education program. Not one of them refused. The plan couples the best capabilities of existing technical and community colleges with the cutting-edge brain power and resources of labor-hungry high-tech businesses.

Intel's program, which has attracted attention from other segments of industry in Texas as a possible model for developing their workforces, includes a six-step plan to prepare work-ready graduates:

1. **Identify the curriculum.** Business professionals sat down with community college faculty members to identify a handful of key courses to serve as building blocks.

2. **Train the faculty.** The business partners opened their own labs and facilities to allow faculty to see the latest technologies in action so they could train students to use them. (In other high-tech communities, Intel helped build state-of-the-art technical centers to train community college faculty.)

3. **Develop instructional technologies for the classroom.** Businesses created a "virtual reality" lab to simulate situations workers will encounter in the workplace. They also bring students to their own facilities for hands-on experiences.

4. **Build enrollment creatively.** Businesses funded a marketing campaign that included creative radio spots, print ads and career fairs, resulting in an increase from 75 students

to more than 1,000 students over three years.

5. **Create retention safety nets.** To slow the rate of attrition, businesses created a scholarship program, offering grants of up to $3,500 to help students defray costs.

6. **Complete the loop—recruit!** It is only at this stage of the plan that the businesses in the partnership compete with one another.

While in the world of industry the businesses taking part in the program are arch rivals, in this initiative they operate as a team, working synergistically to build a pool of qualified workers from which everyone—industry, schools, community and students—can benefit.

Engineering Co-Op Students Are Better Prepared

■ ***Washington University School of Engineering & Applied Science • St. Louis, Missouri*** ■

The ***Cooperative Education Program*** at Washington University School of Engineering & Applied Science has been providing applied learning opportunities for its students since 1986.

Open to all engineering undergraduates, the program places, supervises and evaluates students in off-campus work experiences that complement their academic and career goals. Operating on an alternating semester plan, students rotate between nearly equal periods of full-time school and work. Assignments are in the form of paid employment in industry, business or government agencies. No academic credit is awarded for the co-op experience, but students are allowed to maintain full-time university status during their periods of work.

The co-op work experiences increase graduates' value to employers by documenting their professional aptitude and potential as demonstrated on the job. In addition, these opportunities allow students to lay a solid foundation for building a professional life in their chosen careers.

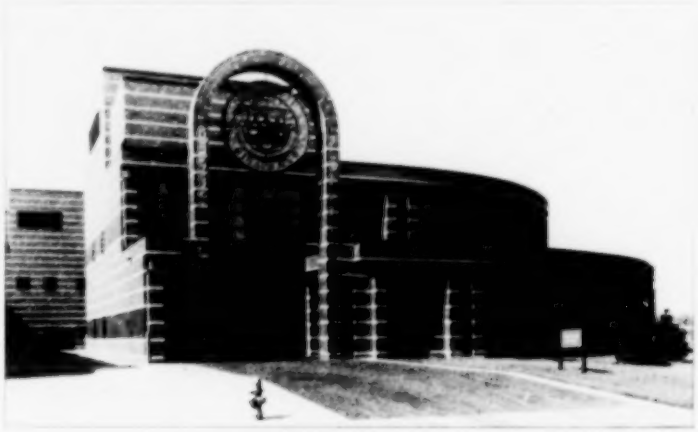
University program staff members secure potential employers; arrange for on-campus recruiting interviews; provide guidance for students; work in cooperation with participating employers; maintain student co-op records and monitor work term progress. Both employers and students complete evaluations at mid-term and at the conclusion of each work assignment.

Based upon employer evaluations, the program is highly successful in easing a student's transition from the college campus to the workplace. Employers indicated that co-op students could communicate better; produce more and higher quality work; follow instructions better and learn more rapidly than most employees. In addition, the employers found these students were more knowledgeable, cooperative and dependable, and more highly motivated than other recent college graduates.

CEEP: Rethinking Engineering Education

■ *University of Michigan-Dearborn • Dearborn, Michigan* ■

Founded in 1991 with a program grant from Ford Motor Company, ***The University of Michigan-Dearborn Center for Engineering Education and Practice (CEEP)*** now is housed in its own 60,000 square foot facility and has become a model of success in integrating the teaching environment with the world of practice.



Today, CEEP operates with more than $6 million in annual support from a cross section of Detroit-area industries, as well as the World Heritage Foundation - The Prechter Fund. The center's mission is to incorporate practice, design, innovation and concepts of manufacturing technology into all levels of engineering education. Projects are initiated and completed in a collaborative atmosphere among practitioners, teaching faculty and students—at both the undergraduate and graduate level.

CEEP focuses on identifying and supporting projects that can help catalyze the existing institutional process. The program also strives to help create new business opportunities that generate new jobs, as well as to work with the region's industries, helping them maintain their competitive edge to prevent the loss of existing jobs to industries outside the state or country. All funded projects are evaluated on the following criteria: industrial relevance, active collaboration with practitioners, long-term technical merit, impact on curriculum and probability of sustained matching funding from external sources.

With offices, classrooms and design studios housed in the same building, the Center is "home" to the following groups:

- a continuing education group for engineering with participation from both university and industry, including on-site personnel from both sectors
- a group for graduate degree programs for working engineers managed by university personnel with advisory boards from industry
- a group for design education and research staffed by faculty, graduate students and engineers from industry on loan on part-time or short-term bases
- a consulting group consisting of faculty, full-time engineers and retired engineers from nearby industries

Each year, the Center funds multiple projects that help resolve real questions in the engineering community, enhance the school's curricula and provide hands-on experiences for students. CEEP has had a dramatic impact on the school, both in terms of program relevance and in increased student enrollment.

2+2+2 Program: Seamless Pathway to Engineering Education

■ *San Jose State University • San Jose, California* ■

Thanks to the initiative of San Jose State University and Silicon Valley area companies, students from diverse educational backgrounds are able to enter the field of manufacturing information systems.

Known as the ***2+2+2 Program***, the project is the result of the collaborative effort of the university and three high school districts (East-Side, Campbell and Sequoia); two community college districts (San Jose-Evergreen and Foothill-DeAnza); six high-tech companies in Silicon Valley (Applied Materials, Hewlett-Packard, IBM, Intel, Lockheed-Martin, and Rockwell Automation/Allen Bradley), and two community organizations (Workforce Silicon Valley and Workplace Learning Center).

The program aims to establish itself as a model for national replication by aligning educational programs, refining curricula for students, delivering faculty enhancement workshops and providing industry experiences.

Large-scale system integration is emphasized in the 2+2+2 Program. The program begins with the last two years of high school during which students can follow a specified course of study to earn a Certificate in Information Technology (CIT) with college/university course credits for articulated courses. The program continues to the community college level in which students can follow a pre-engineering program equivalent to the first two years of engineering at San Jose State University. Or, they can select a related Associate of Science degree in Manufacturing Information Systems Technology (MIST). From there, students can enter the workforce or transfer to San Jose State University's College of Engineering. At San Jose State University, the final two years of the program lead to a B.S. degree in Software & Manufacturing Information Systems Engineering (MISE). The program tracks are designed to provide seamless curriculum transitions.

The success of the 2+2+2 Program is attributed to the vital partnerships formed among local schools, industries and community organizations. Participating companies play an active role in the program by defining customer requirements, designing curriculum, developing case studies, implementing faculty and student internships, developing state-of-the-art laboratories, designing industry-based team projects and committing to matching funds. The two community organizations help in spearheading the co-op enrollment efforts, as well as in administering the assessment portion of the program.

Funding for the 2+2+2 Program came through grants from the Society of Manufacturing Engineers (SME) Education Foundation and the National Science Foundation's (NSF) Advanced Technological Education program. (See "Grant Money Proves Effective Motivator" on page 25.) Additional support was provided by Hewlett-Packard Co., Lockheed-Martin Missiles & Space and Rockwell Automation, a division of Allen-Bradley.

Chase Invests in Future with Education Programs

■ *The Chase Manhattan Corporation • New York, New York* ■

Founded in 1799, The Chase Manhattan Corporation is the largest banking company in the United States and one of the world's premier global financial services institutions. The firm has offices in 39 states, relationships with more than 30 million households in all 50 states, operations in 52 countries and clients in 180 nations.

Chase Manhattan Corporation has discovered that investing in the workers of the future can pay big dividends. Among the initiatives now in place at the company are the following programs:

- **Smart Start Scholarships**
- **Chase Fellows Scholarship Program**
- **College & University Campus Relationship Teams**

Started in 1992, Smart Start not only gives Chase access to bright, company-trained college graduates, it also provides the firm with a wealth of positive public relations exposure. Each year 40 graduating seniors from New York City public and private high schools are awarded scholarships to one of 10 New York area colleges and universities.

In addition to providing four-year tuition and book costs, Smart Start acts as a comprehensive development program that includes paid summer internships along with part-time work at Chase during the school year. The firm's representatives also act as mentors.

To ensure students are exposed to a number of tasks and career opportunities, each must complete four rotational job assignments during their program tenure. They also are required to attend skills assessment workshops, management training and career seminars, all designed to help the students focus their interests.

In 1998, Chase launched the Chase Fellows Program, a broad-based effort to assist minority students interested in pursuing careers in the financial services industry. Each year, Chase names 10 Fellows from among the top

MBA talent at five of the country's leading business graduate schools. Each Fellow receives $12,500 per year for two years. He or she has the opportunity to pursue a paid internship during the summer and other project work during the school year. In addition, Chase Fellows are assigned a senior-level mentor and have access to Chase's full range of career guidance and professional development resources.

The program, with $1.25 million in funds, is a five-year grant to the participating universities.

The College & University Campus Relationship Teams are critical to Chase's college recruitment strategy. Campus Teams are a diverse composite of Chase professionals of all levels from across the various business platforms. The teams partner with faculty, student organizations, administration and career services at key schools to establish a pipeline of the best and the brightest.

In developing each relationship, the first step is to identify the needs of the school, the students and the company. Teams then work out plans to meet the needs. Components of these company-college relationships have included: student and faculty internships and/or visits to Chase corporate headquarters; visiting executive lectures; training on interviewing and resume writing skills; seminars on corporate culture, mentoring programs and team projects.

PROFESSORS GAIN VALUABLE INSIGHTS FROM INTERNSHIPS

■ *TIAA-CREF • New York, New York* ■

A nonprofit organization, TIAA-CREF is the nationwide retirement and financial services system for people who work at colleges, universities, independent schools and other nonprofit education and research institutions throughout the United States.

During discussion of the work underlying the Forum's original *Spanning the Chasm* study, one of its corporate members, John H. Biggs, Chairman, President and CEO of TIAA-CREF, wondered what would happen if higher education's "literary intellectuals" were given a chance to see first hand the "dull and humdrum" workings of business. Biggs' thought process initiated what eventually became known as the ***TIAA-CREF Summer Faculty Fellows Program.***

From the beginning, the program was viewed by the company as a win-win scenario for academia and business. Professors would return to their campuses with a higher opinion of the business world which they in turn would pass on to students. TIAA-CREF employees would gain a better appreciation of "true educators" and the role they play in shaping the future of society.

Now in its fourth year, TIAA-CREF's Summer Faculty Fellows Program continues to offer four-week internships each summer to two professors, preferably from the humanities—those typically most scornful of the business world. To attest to the success of the program, there now is a waiting list of applicants.

During their internships, the professors are brought to the company's New York City headquarters for an intense exposure to all aspects of the business world. They sit in on board meetings and executive briefings. They meet with the firm's lawyers and financial advisors. They are shown how marketing decisions are reached. In general, they are given an up-close look at the satisfactions and stresses of daily life within a large and growing mid-town Manhattan company.

Since its inception, the program's interns have included a Hawthorne scholar, a specialist in medieval English love poetry, a widely published student of American jazz and an editor of a Spanish textbook. In writing of

their experiences after completing the program, all have said they now have a much better appreciation for the world of business.

The Hawthorne scholar, Gerald Early, from Washington University in St. Louis, Missouri was one of the program's first participants. He may have summed up this new appreciation best when he wrote: ". . .real thinking of a very powerful sort goes on here. This must be said because a professor, and especially a humanities professor, is naturally convinced that no real thinking goes on anywhere else in the world but in the small portion of the academy that he or she occupies. I return to my desk. . . a better writer and professor for the experience. . . I found something (worthwhile): the human faces, vivid with intelligence, etched with lucidity, that frame the corporate world."

GRANT MONEY PROVES EFFECTIVE MOTIVATOR

■ ***Society of Manufacturing Engineers & SME Education Foundation • Dearborn, Michigan*** ■

Dedicated to serving its members and the manufacturing community, the Society of Manufacturing Engineers (SME) invests in manufacturing to advance professionalism, knowledge and learning. Providing benefits that enhance the effectiveness of the manufacturing practitioner, SME has more than 60,000 members with 295 chapters, districts and regions, as well as 275 student chapters worldwide.

Education Foundation: To strengthen manufacturing engineering technology education programs, SME's Education Foundation has distributed $85.1 million in cash grants, equipment and software gifts to colleges and universities since 1979.

The Society of Manufacturing Engineers (SME) and its affiliate, the SME Education Foundation (SME-EF) have found a sure way to motivate change: offering grant money as an incentive.

In its first year, the SME-EF's Manufacturing Education Plan (MEP) Grants Program allocated $1.7 million in grant funding to nine college and university initiatives. Funding priority was given to proposals that utilized industry-education partnerships to address competency gaps identified by employers of recent college graduates. These gaps—many of the same skill deficiencies mentioned in this report—were identified in 1996 through a special MEP study, jointly funded by SME and SME-EF.

In June 1998, the first slate of college and university grant recipients included:

- ***Bradley University, Peoria, Ill.*** — $250,000 to enhance the technical, non-technical and social skills of manufacturing engineering and technology students, as well as those of working professionals, through the development of new instructional delivery systems, learning modules and courses.

- ***California State University, Long Beach, Calif.*** — $250,222 to develop and integrate a curriculum for undergraduate and graduate students interested in aerospace manufacturing engineering and to develop training and certificate programs for industry employees. The focus is on helping students become effective members of Integrated Product Development (IPD) teams.

- ***Erie Community College, North and South Campuses, N.Y.*** — $122,240 to develop a model credit-bearing apprenticeship program to deliver comprehensive education and training needed by the manufacturing workforce and students preparing to enter skilled trades.

- ***Michigan Technological University, Houghton, Mich.*** — $170,450 to develop a Program in Integrated, Sustainable Manufacturing (PrISM) to improve undergraduate engineering and technology students' understanding and appreciation of the diverse business, processing and environmental demands of modern manufacturing.

- ***Polytechnic University, Brooklyn, N.Y.*** — $199,875 to develop a "Manufacturing Across the Curriculum" program to be available to all engineering majors and to draw course work and team projects from the various engineering disciplines.

- ***San Jose State University, San Jose, Calif.*** — $167,000 to design and implement a curriculum enabling students of diverse educational backgrounds to enter the workforce, a community college or a university program in manufacturing information systems engineering. *(See "2+2+2 Program: A Seamless Pathway to Engineering Education" on page 21.)*

- ***Tufts University, Medford, Mass.*** — $182,921 to develop the Tufts Prototyping Shop (TPS), a non-profit enterprise with a business structure and practices. The fully equipped shop will be staffed by teams of undergraduate and graduate students, as well as professional engineers in the school's certification program.

- ***University of Southern California and California State University, Los Angeles, Calif.*** — $279,510 to develop 10 engineering case studies to focus on the product realization process within the context of a globally competitive market.

- ***Utah State University, Logan, Utah*** — $126,508 to allow release time for key faculty curriculum reform, and promoting teaming arrangements with industry, as well as with other departments/colleges within the university. The long-range goal of the university is development of a seamless lifelong educational model.

In late April 1999 the SME Education Foundation expanded its initial $1.7 million investment with an additional $1.3 million for five new major educational initiatives.

The 1999 grant recipients include:

- Alexandria Technical College, MN $98,500
- Cleveland State University, OH $71,414

- Kansas State University $336,000
- University of Colorado at Denver $397,828
- Washington State University at Vancouver — $387,376

To help augment its MEP Grants Program funding capabilities, the SME Education Foundation actively seeks partnerships with other organizations and corporations. In the fall of 1998, the National Science Foundation (NSF)—an independent federal agency whose mission is to promote and advance scientific and engineering progress in the United States—agreed to collaborate with the SME Education Foundation in funding additional MEP educational grant recipients through its Course, Curriculum and Laboratory Improvement Program.

This agreement allows colleges and universities applying for grant money to save time and effort by submitting the same proposal to both the SME Education Foundation and NSF. Still in its infancy, the co-funding incentive has resulted in numerous new submissions of collaborative proposals for industry-driven changes in manufacturing engineering education. (For more information visit the SME website at: www.sme.org.)

STRATEGIES PROPOSED FOR CREATING GLOBALLY LITERATE WORKFORCE

■ *American Council on Education (ACE) • Washington, D.C.* ■

Founded in 1918, ACE is the nation's leading higher education organization representing the chief executive officers at more than 1,700 accredited, degree-granting colleges and universities and higher education-related associations, organizations and corporations in the United States.

Recognizing that one of the most pressing—and daunting—challenges facing higher education today is to respond to the demands of an increasingly global society, the American Council on Education (ACE) is now proposing to undertake a multi-year initiative to promote comprehensive internationalization on U.S. college and university campuses.

This initiative represents an effort to create a strong national call for action. Despite the fact that recent studies indicate most U.S. college graduates are ill-equipped to succeed in different cultures, for most colleges and universities, international education is still marginal in undergraduate studies.

The ACE proposed activities will focus on the undergraduate level and include a highly visible set of initiatives to:

- ***create a strong national movement to emphasize the need for comprehensive internationalization***
- ***collect and examine data that will provide a status report on international education in the U.S.***
- ***develop a network of six to eight similar institutions to serve as a laboratory for comprehensive internationalization***
- ***reframe and articulate the assumptions of, and goals for, international education***
- ***identify the outcomes for students, faculty, institutions and communities of putting international education at the core of the undergraduate experience***
- ***recognize innovative and effective efforts for achieving comprehensive internationalization through a national award program***
- ***energize and assist boards, administrators and faculty in providing leadership to internationalize their campuses***

Transforming the undergraduate experience and planning for comprehensive internationalization will require many linked institutional changes involving the curriculum, student life, faculty development and relationships with groups outside the campus.

Collaborative work with strategically targeted partners will be critical to the success of this initiative. As such, ACE proposes to engage in dialogue with, among others, leaders in business and government concerning the issues of national priorities and partnerships with higher education. The Council will work in this regard through the Business-Higher Education Forum, a partnership of ACE and the National Alliance of Business.

At the time of publication, this ACE initiative to help higher education better prepare students for today's global workforce is still in the proposal stage and is working to identify funding sources. For additional information, contact, ACE International Initiatives (202) 939-9418.

Business-Higher Education Forum

a partnership of the American Council on Education and the National Alliance of Business

Membership is comprised of chief executives from American businesses, colleges and universities, and museums.

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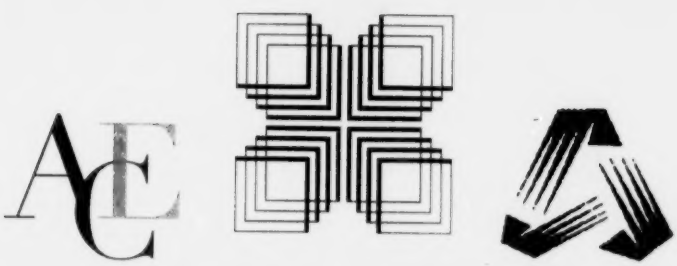

Business-Higher Education Forum

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